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Use of complementary and alternative medicine among adult with epilepsy - experiences from a single epilepsy center in Malaysia

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Abstract: Complementary and alternative medicine (CAM) usage were reported in Europe, the United States of America and monoethnic Asian countries such as Korea and Taiwan. However, limited literature is available on the variability of CAM usage patterns among people with epilepsy (PWE) in a multi-racial country in particular Malaysia. This cross-sectional study assessed the prevalence, types, predictors and impact of CAM use among adult PWE and their adherence to antiepileptic drugs (AEDs) treatment.140 patients were recruited, with a median age of 37.5 (IQR,28.0-51.5) years, majority female, had secondary or lower education level, earn <USD1077 and seizure frequency of <1 per month. One quarter (25.7%) used CAM for seizure control, of which 94.4% adhered to AEDs treatment while on CAM. Common CAM used were prayers, traditional herbal remedies, massage, and acupuncture. Only 33.3% have discussed CAM usage with their physician. The main reason for CAM usage was patients' willingness to try other alternatives for seizure control. Although most patients had not used CAM, 20.2% were receptive to using CAM as concomitant treatment. Buddhists were more open to CAM while Muslims uses CAM selectively and avoid amulets, acupuncture, chiropractic, Ayurveda, yoga, and reiki. Logistic regression analysis showed Buddhist's religion (OR,11.01), Muslims (OR,4.04), ≥1 seizure per month (OR,3.85) and monthly income of ≥USD1077 (OR,2.92) as the predictors for CMA usage. CAM use is common in Malaysia, especially among Buddhists and Muslims, with higher socio-economic status, and uncontrolled seizures. CAM is mostly used to complement but not in replacement of AEDs.

Keywords: Epilepsy; Complementary; Alternative Medicine; Adherence;

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1.0 INTRODUCTION

Epilepsy, a chronic illness with a point prevalence of active disease of 6.38 per 1000 persons, is one of the commonest neurological disorders worldwide (Fiest et al., 2017). Conventional treatment for epilepsy includes the use of anti-epileptic drugs (AEDs). In recent years, non-drug therapies for pharmaco-resistant epilepsy such as epilepsy surgery, implantable device or diet therapy have shown impressive results in some cases. Despite the various forms of treatment available, more than one-third of newly diagnosed PWE does not achieve seizure freedom (Chen et al., 2018). Thus, many patients have considered the use of complementary and alternative medicine (CAM) together with their AEDs (Clarke et al., 2015; Metcalfe et al., 2010).

CAM consist of a group of various medical and healthcare system, practices, and products that were not included as part of the available conventional treatment for diseases (National Center for Complementary and Integrative Health, July 2018). CAM is classified into four domains of practice which consist of mind-body medicine (meditation, prayer/spirituality, yoga), biologically-based practices (natural substances such as herbal remedies, dietary supplements), manipulative and body-based practices (chiropractic care and massage therapy), and energy medicine (acupuncture and "Reiki") (McElroy-Cox, 2009). Despite limited literature on the effectiveness of CAM in achieving better seizure control, the use of CAM is common in the United States of America (42%), Germany (65%) and the United Kingdom (20%), and there is an increasing trend (Samuels et al., 2008). Similarly in African and Asian countries, CAM has been frequently used as a primary method of healthcare (Farrukh et al., 2018; Jeong et al., 2016). However, the prevalence and types of CAM used in PWE differs between countries due to differences in cultural belief and the type of CAM available (Farrukh et al., 2018).

CAM is widely accepted among Asian populations but has its consequential effect on AEDs compliance and epilepsy management. Thus, many studies were performed to understand the use of CAM. In India, 32% of PWE have used CAM for seizure control. Ayurvedic medicine is the most common, followed by homeopathy, either alone (43%) or in combination (38%) with other CAM therapies (Tandon et al., 2002). A Korean study reported herbal remedies as the most common form of CAM used followed by health food, folk remedies, acupuncture and spirituality (Kim et al., 2006). There were 49.1% of Taiwanese patients using CAM such as traditional medicine (51.5%) and temple

worship (48.0%) to manage their epilepsy (<u>Kuan et al., 2011</u>). In the North American continent, CAM usage such as stress management, medical marijuana, vitamins and supplements were common among PWE (<u>Liow et al., 2007</u>; <u>McConnell et al., 2014</u>; <u>Sirven et al., 2003</u>). In the Middle East, traditional Arab and Islamic medicine (TAIM) were prominently used with popular forms of CAM therapies such as 'mind-body' type (incantations and fumigation) and biologically based (herbal concoctions) (<u>Al Asmi et al., 2013</u>; <u>Mesraoua et al., 2021</u>).

However, there might be ethnic and cultural variations in CAM usage in Malaysia, which may affect healthseeking behavior among PWE of different ethnicity to attain seizure freedom. To the best of our knowledge, studies investigating the pattern and impact of CAM usage among PWE, especially in multi-racial and multireligious Malaysia, are limited. In Malaysia, the three main ethnicities are Malays, followed by Chinese and Indians. The practices among the Chinese and Indians might be similar to the Chinese in Taiwan and Indians in India, but the Malays have different cultural and religious practices. Further research is warranted to determine the similarity and differences in the pattern of CAM usage as well as its consequential effect on AEDs adherence and disease management in various ethnic groups. Therefore, we aim to determine the prevalence, types, predictors and impact of CAM use among adult PWE in Malaysia and its cultural variation. This study also investigates the adherence to AEDs in those using CAM. The findings of this study may guide decisions on CAM usage in various ethnicities, ensure better adherence to epilepsy treatment and improve patient satisfaction during healthcare consultation.

2.0 MATERIALS AND METHODS

2.1 Sample recruitment

This is a cross-sectional study involving 140 PWE, age of 18 years and above, with a diagnosis of epilepsy certified by neurologists, were able to read in English or Bahasa Malaysia, were treated in an adult neurology clinic in University Malaya Medical Centre (UMMC). Those who refused or were unable to provide consent, or without a history of seizures were excluded. Patients were recruited from the clinic via convenient sampling. This study was approved by the University Malaya Medical Ethics Committee (MECID. No. 20191018-7928).

2.2 Measures

A questionnaire was developed based on available literature to assess the usage of CAM amongst PWE as

part of their epilepsy management (Beattie et al., 2017; Chen et al., 2016; Durón et al., 2009; Quandt et al., 2009). The questionnaire was reviewed by a neurologist, two pharmacists and 10 patients, for its content validity, and modified accordingly. Informed consent was obtained prior to the study. Sociodemographic and clinical information were collected. Monthly income was divided by RM4,360 (USD1,077) based on the B40 (bottom 40% low-income population) line in Malaysia. The usage of CAM was assessed in 4 sections, included (1) the use of CAM, (2) category of CAM including mind-body practices (praying, wearing the amulet, music therapy, yoga), biologically based practices (traditional herbs, homeopathy and Ayurveda, ketogenic diet and vitamins and supplements) manipulative and body-based practices (chiropractic and massage) and energy medicine (reiki and acupuncture) (Chui et al., 2014; Farrukh et al., 2021), and its effectiveness (3) justification of CAM usage/nonusage, and (4) adherence towards conventional medications.

2.3 Statistical analysis and sample size calculation

Statistical analysis using IBM® SPSS® Statistics software (version 25.0) was performed with a significance level defined at 0.05. The sample size was calculated was performed using OpenEpi (Dean et al., 2013), Version 3, an open-source statistical software package. We used the lowest prevalence of 30% reported in other studies, and a population of 200 in our epilepsy cohort, with a confidence interval set at 95%. A minimum of 124 samples is needed in this study. Shapiro-Wilk test was used to identify the median age in years. Pearson's chisquare test (x2) was used to analyze categorical variables. Predictors of CAM use were ascertained with multivariate logistic regression. A two-tailed p-value of less than 0.05 was considered significant for the univariate analysis for variables which were then entered into the final models of logistic regression.

3.0 RESULTS

A total of 140 out of 165 patients completed the survey in this study, with a respondent rate of 84.8%. The median age was 37.5 [IQR, 28.0-51.5] years, and 50.7% were female. The majority were Chinese (50.7%), Buddhist (40.7%), with a secondary or lower level of education (63.6%), and with a monthly income of less than RM4,360 (USD1,077, 72.1%). The median age of seizure onset was 17.5 [IQR, 7.0-30.0] years. The majority had less than one seizure attack per month (47.1%). One hundred and thirty-four patients (95.7%) were on AEDs with 71.6% reported AEDs to be effective

in controlling their seizures. Another thirty-eight patients (28.4%) agreed that AEDs has been only slightly effective or less in controlling their seizures. The median years of taking AEDs were 16.0 [IQR, 6.8-24.3]. (Table 1).

3.1 Prevalence of CAM usage and adherence to AEDs regime as a treatment for epilepsy

Thirty-six patients (25.7%) have tried CAM for seizure control, of which the majority (94.4%) continued their AEDs treatment while on CAM. Another 5.6% opted to discontinue their AEDs and fully transitioned to CAM as their epilepsy treatment. A majority of them (86.1%) used CAM because they would try anything that would help to alleviate their condition (epilepsy), and some (8.3%) were because of the side effects of AEDs. The majority tried CAM due to suggestions from a family member (52.8%), followed by self-decision (27.8%) or friends (25.0%). Sources of CAM information include the personal accounts of family members (41.7%) and friends (33.3%), healthcare professionals such as doctors or pharmacists (27.8%) as well as the internet (16.7%).

Only 12 patients (33.3%) have discussed the use of CAM with their healthcare service providers. One patient (2.8%) stopped using AEDs in their treatment in the past month while another 2 (5.6%) stopped in the past year. Half of the patients (50.0%) continued CAM, even though 91.7% experienced side effects such as allergic reactions, vomiting, diarrhea and others while using it, specifically traditional herbal remedies. (Table 1)

3.2 Justification of non-CAM usage as a treatment for epilepsy

A majority of them have not tried CAM (n=104, 73%) with reasons such as believing in the effectiveness of conventional AEDs (56.7%), inadequate CAM information (45.2%) and doubts on the effectiveness of CAM in managing epilepsy (21.2%). Twenty-one patients (20.2%) were receptive to the idea of using CAM as a treatment for their epilepsy (Table 1).

3.3 Prevalence and types of CAM usage

The most common type of CAM used was praying (72.2%) followed by traditional herbs (58.3%), massage (58.3%), and acupuncture (47.2%). Half (50.0%) who has tried praying agreed on its effectiveness in their seizure control, 27.8% in traditional herbs, and 41.7% in massage. However, about half (23.1-88.9%) were unsure of the effectiveness of various types of CAM in seizure control. (Table 2)

Table 1: Socio-demographic and clinical characteristics of the patients, and the usage of CAM and their reasons (N = 140).

Variables		Number of patients, n (%)			
Sociodemographic Characteristics					
Gender	Male	69 (49.3)			
	Female	71 (50.7)			
Median age* [IQR]		37.5 [28.0 - 51.5]			
Race	Malay	33 (23.6)			
	Chinese	71 (50.7)			
	Indian	34 (24.3)			
	Others	2 (1.4)			
Religion	Muslim	35 (25.0)			
_	Buddhism	57 (40.7)			
	Others	48 (34.3)			
Education level	Secondary and below	89 (63.6)			
	Tertiary	51 (36.4)			
Monthly income	<rm4360 (usd1077)<="" td=""><td>101 (72.1)</td></rm4360>	101 (72.1)			
	≥RM4360 (USD1077)	39 (27.9)			
	Clinical Characte	ristics			
Median of years of epil	epsy diagnosis [IQR]	17.5 [7.0 -30.0]			
	<1	66 (47.1)			
Number of	1 to 5	48 (34.3)			
seizure attack	6 to 10	11 (7.9)			
per MONTH	11 to 15	7 (5.0)			
	≥16	8 (5.7)			
Taking AEDs	Yes	134 (95.7)			
	No	6 (4.3)			
Effectiveness of AEDs	Very effective	26 (19.4)			
	Effective	70 (52.2)			
	Slightly effective	25 (18.7)			
	Not effective at all	6 (4.5)			
	Not sure	7 (5.2)			
Median years of taking	AEDs [IQR]	16.0 [6.8 -24.3]			
Use	of Complementary and Alterr	native Medicine (CAM)			
Tried CAM	Yes	36 (25.7)			
	No	104 (74.3)			
	Reasons for CAM us	se (n=36)			
Are you still taking the	AEDs prescribed by doctor afte	r starting the CAM treatment?			
Yes, continue		34 (94.4)			
No, did not contin	ue	2 (5.6)			

^{*} Shapiro-Wilk test was used; ** Includes allergic reactions, vomiting, diarrhea and others secondary to traditional herbal remedies

Variables		Number of patients, n (%)
Why would you choose to try CAM th		
Side effects of AED	•	3 (8.3)
Worried effectiveness of AED	2 (5.6)	
I will try anything that will help to	31 (86.1)	
The CAM treatment works for so	meone that I know	2 (5.6)
Others		1 (2.8)
Person who suggests	Family member	19 (52.8)
	Friends	9 (25.0)
	Doctor/Pharmacists	4 (11.1)
	No one	10 (27.8)
	Others	1 (2.8)
Way of obtaining info	Family member	15 (41.7)
	Friends	12 (33.3)
	Doctor/Pharmacists	10 (27.8)
	Internet	6 (16.7)
	Newspaper/Magazine	1 (2.8)
	Social Media	2 (5.6)
	Others	1 (2.8)
Ever discuss with doctor about CAM	Yes	12 (33.3)
	No	24 (66.7)
Stopped AED for the past one MONT	H Yes	1 (2.8)
	No	35 (97.2)
Stopped AED for the past one YEAR	Yes	2 (5.6)
	No	34 (94.4)
Side effects of CAM**	Yes	33 (91.7)
	No	3 (8.3)
Continue CAM	Yes	18 (50.0)
	No	9 (25.0)
	Not sure	8 (25.0)
Reaso	ons for not using CAM (n=104	1
What is the possible reason/s you are	e not using any CAM treatment	:?
I believe in the effectiveness of c	onventional AEDs	59 (56.7)
I do not have much information r available	egarding CAM treatment	47 (45.2)
I doubt the effectiveness of CAM my condition	treatment in managing	22 (21.2)
Others; Never considered		2 (1.92)
If you are new to CAM treatment, will treatment to help in managing your e		
acadinent to help in managing your	Yes	21 (20.2)
	No	49 (47.1)
		` '
	Not sure	34 (32.7)

Table 2: Prevalence and types of CAM used (N=36)

Category of CAM, (n, %)	Effectiveness of CAM used, N (%)						
(11, 70)	Not sure	Not effective at all	Slightly effective	Effective	Very effective		
Mind-body practice							
Praying (26, 72.2%)	6 (23.1)	2 (7.7)	7 (26.9)	6 (23.1)	5 (19.2)		
Wearing amulet (13, 36.1%)	7 (53.8)	2 (15.4)	2 (15.4)	2 (15.4)	-		
Music therapy (11, 30.6%)	5 (45.4)	-	2 (18.2)	2 (18.2)	2 (18.2)		
Yoga (11, 30.6%)	9 (81.8)	-	1 (9.1)	1 (9.1)	-		
Biologically based Practices							
Traditional herbs (21, 58.3%)	6 (28.5)	5 (23.8)	8 (38.1)	1 (4.8)	1 (4.8)		
Homeopathy (13, 36.1%)	8 (61.5)	1 (7.7)	4 (30.8)	-	-		
Ketogenic diet (13, 36.1%)	7 (19.4)	-	2 (5.6)	4 (11.1)	-		
Vitamins and Supplements (12, 33.3%)	2 (16.7)	2 (16.7)	5 (41.6)	1 (8.3)	2 (16.7)		
Ayurveda (9, 25.0%)	8 (88.9)	-	1 (11.1)	-	-		
Manipulative and body-based P			· · ·				
Massage (21, 58.3%)	6 (28.5)	-	10 (47.6)	4 (19.1)	1 (4.8)		
Chiropractic (9, 25.0%)	8 (88.9)	1 (11.1)	-	-	-		
Energy medicine							
Acupuncture (17, 47.2%)	7 (41.1)	6 (35.3)	2 (11.8)	2 (11.8)	-		
Energy healing (Reiki) (10, 27.8%)	8 (80.0)	1 (10.0)	1 (10.0)	-	-		

Table 3: Comparison of socio-demographic and clinical characteristics between CAM users (N=36) and non-CAM users (N=104)

Variables		Patient using CAM (n=36), n (%)	Patient not using CAM (n=104), n (%)	<i>p</i> -value
Gender	Male	18 (26.1)	51 (73.9)	1.00
	Female	18 (25.4)	53 (74.6)	1.00
Median ag	ge [IQR] ⁿ	31.00 [24.50 - 41.00]	39.50 [30.00 -53.75]	0.01
Race	Malay	10 (30.3)	23 (69.7)	0.14
	Chinese	22 (31.0)	49 (69.0)	
	Indian	4 (11.8)	30 (88.2)	
	Others	0 (0.0)	2 (100.0)	
Religion	Muslim	10 (28.6)	25 (71.4)	0.00
	Buddhism	22 (38.6)	35 (61.4)	
	Others	4 (8.3)	44 (91.7)	
Education	level			
	Secondary and below	16 (18.0)	73 (82.0)	0.01
	Tertiary	20 (39.2)	31 (60.8)	
Monthly in	ncome			
-	<rm4360 (usd1077)<="" td=""><td>17(16.8)</td><td>84 (83.2)</td><td>0.00</td></rm4360>	17(16.8)	84 (83.2)	0.00
	≥RM4360 (USD1077)	19 (48.7)	20 (51.3)	
Median of	years of diagnosis [IQR] n	18.50 [10.50-27.50]	16.50 [6.25-30.00]	0.52
	f seizure attack per month			
	<1	11 (16.7)	55 (83.3)	0.03
	≥1	25 (33.8)	49 (66.2)	

ⁿ Analysis using Mann-Whitney U test

3.4 Socio-demographic and clinical characteristics of CAM users

Patients using CAM had a younger median age (31.00 years [IQR, 24.50–41.00] vs. 39.50 [30.00 -53.75] in those not using CAM, p=0.01), higher monthly income (48.7% vs. 16.8% in those with lower income, p<0.001), and education level (39.2% vs. 18.0% in those with lower education level, p=0.01). A subanalysis correlating the category of CAM used and education level showed that those with higher education level have a higher tendency to use biologically based, manipulative and body-based practice, energy medicine, and yoga (p<0.05). **(Table S1)** Those with Muslim (28.6%) and Buddhist (38.6%) faith used CAM more than others (p<0.001). Patients with higher seizure frequency were more likely to use CAM (33.8% vs. 16.7% in those with <1 seizure per month, p=0.03). **(Table 3)**

3.5 Religious variation in CAM usage

Prayers were the most common form of CAM used among the Buddhist community followed by traditional medicine, similar to that of the Muslim community. Acupuncture was used more frequently among the Buddhists (22.8%), compared to Muslims (2.9%) and other religious groups (6.3%, p<0.01). The practice of wearing an amulet was predominantly found among the Buddhism community (17.5%) but less among those with Muslim religion (2.9%, p<0.05). Yoga, reiki, Ayurveda, and chiropractic treatment were not used by the Muslims in this study. **(Table 4)**

3.6 Predictive factors influencing CAM usage

A binary logistic regression analysis was conducted to investigate the predictors of CAM usage. The full model with all predictors was statistically significant, χ 2(7, N=140) = 41.62, p<0.001. The model correctly classified 83.6% of cases. The strongest predictors for CAM usage were Buddhism religion (OR 11.01, 95% CI 3.00-40.42, p<0.001), followed by Muslim religion (OR 4.04, 95% CI 1.04-15.77, p=0.04), \geq 1 seizure attack per month (OR 3.85, 95% CI 1.45-10.25, p=0.01) and monthly income of \geq USD1,077 (OR 2.92, 95% CI 1.10-7.75, p=0.03). **(Table 5)**

4.0 DISCUSSION

CAM was used in 25.7% of the adult PWE in our study, comparable to the Singaporean population (Chen et al., 2016). Majority of patients (94.4%) adhered to their conventional AEDs treatment while using CAM. Similar to other studies, only a third of PWE using CAM reported the use to their healthcare service providers (Lim et al., 2005; Samuels et al., 2008). The reluctance

to disclose the use of CAM leads to difficulty in detecting the CAM-drug interactions and their potential side effects. The possible reasons to not disclose their CAM use was hypothesized to be the fear of physician's disapproval on CAM usage, no inquiry about the use of CAM by the healthcare team, and the belief that CAM was safe and would not interfere with conventional treatment. The under-reporting of CAM use could be resolved with a proactive inquiry by their physicians.

4.1 Types of CAM used

Praying was the commonest form of CAM used by PWE, similar to other studies (<u>Durón et al., 2009</u>; <u>İşler et al., 2014</u>; <u>Liow et al., 2007</u>; <u>Tonekaboni et al., 2014</u>). Despite the cultural differences in our multi-ethnic country, this was expected as daily prayers were common as part of our religious identity. Praying, as a form of spiritual healing would help patients to cope better with their epilepsy leading to an improved sense of well-being (<u>İşler et al., 2014</u>).

Similarly, the traditional herb was another commonly used CAM found in our study (Canter & Ernst, 2004; Kaufman et al., 2002) alongside homeopathy remedies, Ayurveda, vitamins and supplement in PWE. The safety of these traditional herbs remained a major concern to physicians as the quantity and quality of their exact active ingredients were unknown, leading to unpredictable herb-drug interaction. Conventional AEDs used to treat PWE were often prescribed with the expectation that it would act in a predictable and doserelated effect on seizure control. However, when herbal or homeopathy remedies were used before consulting with a physician, it acts as a variable that might affect the drug disposition. These remedies may contain physiologically active substances including AEDs, which when consumed with prescribed AEDs, may lead to AED toxicity (Garg et al., 1998; Lau et al., 2000; Özdemir et al., 1998; Yin et al., 2004). In addition, there were many reports on unsupervised herbal remedies contaminated with neurotoxic heavy metals such as lead and arsenic, which resulted in the lowered seizure threshold (Samuels et al., 2008; Saper et al., 2004). Other CAM forms used include acupuncture, ketogenic diet, yoga, prayers, energy healing (Reiki), and chiropractic (McConnell et al., 2014; McElroy-Cox, 2009; Sirven et al., 2003).

4.2 Reasons for CAM use

While a majority of CAM users in our study used CAM intending to achieve better seizure control or to reduce AED's side effects, CAM users in Singapore were more

likely to use it for maintenance of their health (72%) than for treatment of illness (28%) (Lim et al., 2005). In India, reasons for CAM usage were linked to dissatisfaction over the effectiveness of AEDs, its side effects and costs, the need for personal control over their healthcare decisions and philosophical confluence that were compatible with patient's values and beliefs

(<u>Tandon et al., 2002</u>). In the Middle East, CAM were considered as a therapeutic option by both PWE and physicians of the Iranian society but this was reported to be linked to cultural misbelieves as most did not achieve any benefit (<u>Asadi-Pooya & Emami, 2014</u>; <u>Asadi-Pooya et al., 2019</u>; <u>Mesraoua et al., 2021</u>).

Table 4: Religious variation in CAM used. (N=140)

Category of CAM (N)	Muslim (n=35, 25.0%)	Buddhism (n=57, 40.7%)	Others (n=48, 34.3%)	<i>p</i> -value	
Mind-body practice					
Praying (26)	8 (22.9)	15 (26.3)	3 (6.3)	0.023	
Wearing amulet (13)	1 (2.9)	10 (17.5)	2 (4.2)	0.020	
Music therapy (11)	1 (2.9)	7 (12.3)	3 (6.3)	0.232	
Yoga (11)	0 (0.0)	7 (12.3)	4 (8.3)	0.103	
Biologically based Practices					
Traditional herbs (21)	5 (14.3)	13 (22.8)	3 (6.3)	0.060	
Homeopathy (13)	1 (2.9)	8 (14.0)	4 (8.3)	0.193	
Ketogenic diet (13)	1 (2.9)	9 (15.8)	3 (6.3)	0.078	
Vitamins and Supplements (12)	2 (5.7)	7 (12.3)	3 (6.3)	0.428	
Ayurveda (9)	0 (0.0)	6 (10.5)	3 (6.3)	0.135	
Manipulative and body-based Pract	ices				
Massage (21)	4 (11.4)	13 (22.8)	4 (8.3)	0.093	
Chiropractic (9)	0 (0.0)	7 (12.3)	2 (4.2)	0.048	
Energy medicine					
Acupuncture (17)	1 (2.9)	13 (22.8)	3 (6.3)	0.005	
Energy healing (Reiki) (10)	0 (0.0)	7 (12.3)	3 (6.3)	0.081	

Table 5: Logistic regression model for predictors of CAM usage

	В	D CE Wald 46 Cia F(D)		F(D)	95% CI for EXP(B)			
	В	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Age	028	.02	2.72	1	.10	.97	.94	1.01
Religion: Buddhism	2.40	.66	13.07	1	.00	11.01	3.00	40.42
Religion: Muslim	1.40	.70	4.04	1	.04	4.04	1.04	15.77
Seizure attack per month: ≥1	1.35	.50	7.27	1	.01	3.85	1.45	10.25
Monthly income: ≥USD1077	1.07	.50	4.65	1	.03	2.92	1.10	7.75
Education level: Tertiary	.97	.51	3.59	1	.06	2.63	.97	7.15

The Moorish population believes that epilepsy was caused by excessive consumption of 'iguindi' and certain foods act as an antidote (<u>Traore et al., 1998</u>). In North Africa, the majority of PWE were treated by

traditional healers long before consulting a medical doctor, because of illiteracy, financial limitations, and lack of neurologists (<u>Kissani et al., 2021</u>; <u>Louhab et al., 2005</u>).

However, in Asia, CAM was not perceived to be superior or more effective than conventional medicine in general, and thus in our study majority use CAM concomitantly with their AEDs rather than replacing them (Lim et al., 2005). In Malaysia, CAM were also popularly used among the public for general health maintenance purpose, especially herbs (29.6%) (Siti et al., 2009). This is because of the Asian medicine concept emphasizing the importance to achieve a healthy balance. However, the determination and expectation of CAM practice for a disease are much greater than for general health.

4.3 CAM and perceived efficacy in seizure control

Despite the emerging trend of CAM use among PWE, there has been limited evidence on the efficacy of CAM to achieve better seizure control. Studies from the USA. Taiwan and Korea reported varying results of selfmeasured seizure control while consuming CAM with no direct evidence on its efficacy (Kim et al., 2006; Kuan et al., 2011; McConnell et al., 2014). Many of the CAM modalities available may promote general well-being by improving sleep patterns, exercise and eating habits leading to an indirect reduction in seizure frequency (McConnell et al., 2014). Further trial studies on the efficacy of CAM were warranted to determine its efficacy in seizure control. In this study, about half of the CAM users agreed on the effectiveness of seizure control, but equally another half were unsure of its effectiveness. Despite lack of scientific evidence or certainty about the effectiveness, many people use CAM as an alternative or complementary therapy with the belief that CAM has no or minimal adverse effects, as shown in this study. In addition, most CAM practices health-seeking behaviors are influenced by the sociocultural background rather than scientific evidence. That explains the importance to determine the cultural variations in CAM practice.

4.4 Decision to use CAM and its side effects

The decision for CAM usage was influenced by family members followed by self-decision and advice from a friend, a result similarly echoed in a Turkish study (Goker et al., 2012). Patients especially those who receive personal advice from a trusted confidante tends to have more belief in the safety of CAM and were less likely to report its use with their physicians (Giveon et al., 2004; Samuels et al., 2008). In addition, they may not be aware of the potential side effects of CAM (Chen et al., 2016). In our study, half of our patients continued their CAM usage despite experienced side effects while using it. This may be due to patients' perception of CAM

as natural and safe (Ezeome & Anarado, 2007; Okoronkwo et al., 2014). This perception has encouraged patients with chronic diseases such as epilepsy to continue using CAM despite its effects. Future clinical trials should be conducted to determine the safety and possible side effects of CAM prospectively as in clinical trials.

4.5 Predictors for CAM use

Our finding of frequent seizures attacks leading to the use of CAM as a form of treatment was consistent with several studies (Bosak & Słowik, 2019; Kim et al., 2006; Kuan et al., 2011). Most studies found that patients with a lower socio-economic level and less educated were more likely to use CAM due to the lack of epilepsy knowledge (Chen et al., 2016; Goker et al., 2012). On the contrary, our study showed that those with higher education and income were more likely to use CAM. In line with our findings, a Korean study also reported the association between high income and the use of CAM (Kim et al., 2006). These patients may be more wellresourced to try CAM alongside the conventional treatment and can afford to choose and take control over their health-related issues (Wiles & Rosenberg, 2001). In our study, higher educated PWE used more biologically based, manipulative and body-based practice, energy medicine, and yoga, not the other mind-body practice. The use of CAM among the educated and affluent individuals was probably related to the broader dissemination of the CAM information via the internet and the modernization of CAM industry.

4.6 Cultural variation and cross-cultural influence

This study showed religious variation in the pattern of CAM usage among PWE but no ethnic difference. Malaysia exists as a harmonious multi-religious society with 3 main ethnic groups, where some of the CAM practices were related to religion. Generally, in the Malaysian context, Malays were all Muslims in faith. In contrast, the Chinese could embrace different religions such as Buddhism and Christianity, and Indians practice Hinduism, Christianity or other faiths.

Prayers were the most popular form of CAM used in our study as part of Muslims and Buddhist religious practice. In addition, although amulet wearing was commonly used for health reasons by the Buddhists, it was less frequently used as a medical treatment for Malaysian Muslims, contrary to other studies (Al Asmi et al., 2013; Asadi-Pooya & Emami, 2014). Usage of amulet containing anything other than Qur'anic verses were considered forbidden in Islam, but items such as prayer

beads were still used during prayers among a minority of Muslims. Less frequent use of acupuncture among the Muslims was likely due to religious reasons, and their preference was 'Hijama' also known as cupping therapy or recitation as stated in the Holy Qur'an (Al Asmi et al., 2013).

The Chinese in Malaysia were more open to CAM practised by other cultural groups, but not the Malay (Muslim) population. Chiropractic treatment, popular in the west and mostly used for mechanical disorders of the musculoskeletal system, is gradually gaining its popularity in Asia especially among the Chinese in Malaysia, similarly in Singapore (Lim et al., 2005). Ayurvedic medicine originated from India, and in Malaysia it was accepted by the Chinese Buddhists but not among the Muslims (Tandon et al., 2002). Likewise, yoga and reiki were also not practised by the Muslims.

4.7 Implications

While there is limited literature on the effectiveness of CAM on seizure control, patients were often encouraged to try CAM and accept its potential benefits due to its effectiveness in certain countries (Asadi-Pooya et al., 2019; Kim et al., 2006; Mesraoua et al., 2021). Studies in Korea (Kim et al., 2006) as well as the Middle East and North Africa (MENA) region (Mesraoua et al., 2021) reported reduced frequency in seizure attacks with CAM use while 55% of the neurologist in Iran believed that CAM would be helpful in treating epileptic seizures (Asadi-Pooya et al., 2019). Further research is warranted to establish the effectiveness and safety of CAM, with strict regulations to supervise the production of herbal remedies, vitamins and supplements to ensure safety especially among vulnerable groups such as PWE. Possible interactions between conventional AEDs therapy and these remedies should be further explored and established, especially for AEDs with narrow therapeutic windows. Patients with chronic illnesses, such as epilepsy could benefit from discussion with their healthcare service provider to make informed decisions on CAM usage.

4.8 Limitations

As this study was conducted in a tertiary hospital and predominantly Chinese and limited by small a sample size, the findings may not be representative of the rural communities and patients in primary health care facilities or the Malaysian population in general. Future studies involving a greater percentage of the Malay

population is needed to represent the Malaysian multicultural background. The inclusion of the rural population should also be considered to determine the differences in CAM usage between urban and rural populations. Although a small percentage of our patients switched to the use of CAM as their main form of epilepsy treatment, a community-based survey would be able to capture patients who have completely abandoned the conventional healthcare services after CAM use. Despite these limitations, this present study has contributed to the understanding of CAM usage in multi-ethnic settings and help identify the patients' conceptions and attitudes towards the growing interest in CAM usage. Patients' cultural beliefs should be respected, and our goal should be to guide patients in making informed decisions on CAM usage. This will facilitate better adherence to therapeutic suggestions and improve patient satisfaction with their health care encounter.

5.0 CONCLUSIONS

CAM use is common in Malaysia, especially among those with Buddhism and Muslim religions, higher socio-economic status, and patients with uncontrolled seizures. Despite that, CAM is mostly used in addition to but not in replacement of AEDs. Besides cultural variation, there is a cross-cultural influence in CAM usage.

Supplementary Materials: Table S1: Comparison of CAM usage between those with higher and lower education level. (N=140) is available <u>online</u>.

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